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Test 1515: Ford TW-15 Diesel 16-Speed

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, tractortestlab@unl.edu

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NEBRASKA TRACTOR TEST 1515—FORD TW-15 DIESEL
16 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption			Temperature °F (°C)				Barometer inch Hg (kPa)
		gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Cooling medium	Air wet bulb	Air dry bulb		
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed—Two Hours (PTO Speed—1147 rpm)									
121.40 (90.53)	2200	7.694 (29.121)	0.443 (0.270)	15.78 (3.109)	195 (90.4)	64 (17.5)	75 (23.9)	28.99 (97.89)	
Standard Power Take-off Speed (1000 rpm)—One Hour									
117.83 (87.87)	1918	6.973 (26.391)	0.414 (0.252)	16.90 (3.329)	193 (89.4)	65 (18.1)	75 (23.9)	28.94 (97.73)	
VARYING POWER AND FUEL CONSUMPTION—Two Hours									
108.57 (80.96)	2316	7.311 (27.676)	0.471 (0.287)	14.85 (2.925)	194 (89.7)	65 (18.1)	75 (23.9)	..... .....
0.00 (0.00)	2430	2.414 (9.139)	..... .....	..... .....	182 (83.3)	64 (17.8)	75 (23.6)	..... .....
55.68 (41.52)	2375	4.837 (18.310)	0.608 (0.370)	11.51 (2.268)	186 (85.3)	64 (17.8)	74 (23.3)	..... .....
121.75 (90.79)	2200	7.693 (29.120)	0.442 (0.269)	15.83 (3.118)	198 (91.9)	64 (17.8)	74 (23.1)	..... .....
28.12 (20.97)	2403	3.623 (13.716)	0.901 (0.548)	7.76 (1.529)	185 (84.7)	64 (17.8)	74 (23.1)	..... .....
82.52 (61.54)	2346	6.141 (23.244)	0.521 (0.317)	13.44 (2.647)	188 (86.4)	65 (18.1)	75 (23.9)	..... .....
Av Au	66.11 (49.30)	2345 (20.201)	5.337 (0.344)	12.39 (2.440)	188 (86.9)	64 (17.9)	74 (23.5)	28.89 (97.56)	

DRAWBAR PERFORMANCE WITH BIAS PLY TIRES

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption			Temp. °F (°C)			Barom. inch Hg (kPa)
					gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Cool- ing med	Air wet bulb	Air dry bulb	
Maximum Available Power—Two Hours 8th (5L) Gear											
105.89 (78.96)	7778 (34.60)	5.11 (8.22)	2199	6.12	7.654 (28.975)	0.506 (0.308)	13.83 (2.725)	200 (93.1)	52 (10.8)	59 (15.0)	28.73 (97.00)
75% of Pull at Maximum Power—Ten Hours 8th (5L) Gear											
86.84 (64.76)	5903 (26.26)	5.52 (8.88)	2338	4.58	6.787 (25.691)	0.547 (0.333)	12.80 (2.521)	197 (91.4)	51 (10.3)	54 (12.1)	28.61 (96.62)
50% of Pull at Maximum Power—Two Hours 8th (5L) Gear											
59.64 (44.47)	3936 (17.51)	5.68 (9.14)	2366	3.00	5.482 (20.751)	0.643 (0.391)	10.88 (2.143)	193 (89.2)	55 (12.5)	64 (17.5)	28.73 (97.00)
50% of Pull at Reduced Engine Speed—Two Hours 11th (6L) Gear											
59.60 (44.45)	3937 (17.51)	5.68 (9.14)	1532	3.04	4.074 (15.421)	0.478 (0.291)	14.63 (2.882)	190 (87.5)	55 (12.8)	61 (15.8)	28.72 (96.97)
MAXIMUM POWER IN SELECTED GEARS											
88.44 (65.95)	13247 (58.93)	2.50 (4.03)	2317	14.89	3rd (2L) Gear			198 (92.2)	53 (11.7)	59 (15.0)	28.60 (96.58)
99.43 (74.14)	12072 (53.70)	3.09 (4.97)	2200	12.10	4th (3L) Gear			199 (92.8)	54 (12.2)	60 (15.6)	28.60 (96.58)
99.53 (74.22)	11766 (52.34)	3.17 (5.10)	2199	11.56	5th (2H) Gear			201 (93.6)	54 (12.2)	61 (16.1)	28.60 (96.58)
102.24 (76.24)	9214 (40.98)	4.16 (6.70)	2200	7.96	6th (3H) Gear			202 (94.2)	54 (12.2)	61 (16.1)	28.60 (96.58)
104.66 (78.04)	9058 (40.29)	4.33 (6.97)	2201	7.74	7th (4L) Gear			201 (93.6)	54 (12.2)	60 (15.6)	28.60 (96.58)
107.00 (79.79)	7871 (35.01)	5.10 (8.20)	2200	6.39	8th (5L) Gear			200 (93.3)	53 (11.7)	59 (15.0)	28.59 (96.54)
105.17 (78.43)	6915 (30.76)	5.70 (9.18)	2200	5.55	9th (4H) Gear			200 (93.1)	53 (11.7)	59 (15.0)	28.60 (96.58)
106.98 (79.78)	6008 (26.72)	6.68 (10.75)	2202	4.61	10th (5H) Gear			201 (93.6)	53 (11.7)	59 (15.0)	28.59 (96.54)
107.24 (79.97)	4968 (22.10)	8.09 (13.03)	2201	3.73	11th (6L) Gear			200 (93.3)	53 (11.7)	59 (15.0)	28.59 (96.54)
LUGGING ABILITY IN 8th (5L) GEAR											
Crankshaft Speed rpm				2200	1977	1757	1542	1316	1098		
Pull—lbs (kN)				7871 (35.01)	8654 (38.79)	9210 (41.28)	9482 (42.50)	9237 (41.40)	8254 (37.00)		
Increase in Pull %				0	10	17	20	17	5		
Power—Hp (kW)				107.00 (79.79)	104.79 (78.14)	98.49 (73.45)	88.73 (66.17)	73.92 (55.12)	55.71 (41.54)		
Speed—Mph (km/h)				5.10 (8.20)	4.54 (7.31)	4.01 (6.45)	3.51 (5.65)	3.00 (4.83)	2.53 (4.07)		
Slip %				6.39	7.07	7.67	7.96	7.67	6.77		
TRACTOR SOUND LEVEL WITH CAB							Radial Ply dB(A)	Bias Ply dB(A)			
Maximum Available Power—Two Hours							78.5	79.0			
75% of Pull at Maximum Power—Ten Hours								79.0			
50% of Pull at Maximum Power—Two Hours								79.0			
50% of Pull at Reduced Engine Speed—Two Hours								77.0			
Bystander in 16th (8H) gear								87.5			

Department of Agricultural Engineering

Dates of Test: April 25 to May 12, 1984

Manufacturer: FORD MOTOR COMPANY,
2500 Maple Road, Troy, Michigan 48084

FUEL, OIL AND TIME: Fuel No. 2 Diesel
Cetane No. 46.0 (rating taken from oil company's inspection data) Specific gravity converted to 60°/60° (15°/15°) 0.8402 Fuel weight 6.996 lbs/gal (0.838 kg/l) Oil SAE 30 API service classification SE, SF, CC, CD To motor 4.257 gal (16.115 l) Drained from motor 3.956 gal (14.975 l) Transmission and final drive lubricant Ford 134 fluid Total time engine was operated 44.0 hours.

ENGINE: Make Ford Diesel Type six cylinder vertical with turbocharger Serial No. *U732866* Crankshaft lengthwise Rated rpm 2200 Bore and stroke 4.4" × 4.4" (112 mm × 112 mm) Compression ratio 15.6 to 1 Displacement 401 cu in (6572 ml) Starting system 12 volt Lubrication pressure Air cleaner two paper elements and centrifugal precleaner Oil filter one full flow cartridge Oil cooler heat exchanger in lower part of radiator for crankcase oil, radiator for hydraulic and transmission oil Fuel filter one paper element and sediment bowl Muffler vertical Cooling medium temperature control two thermostats and variable speed fan.

CHASSIS: Type standard with duals Serial No. *C713305* Tread width rear 60" (1524 mm) to 120" (3048 mm) front 60" (1524 mm) to 84" (2134 mm) Wheel base 109.7" (2786 mm) Center of gravity (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 29.3" (745 mm) Vertical distance above roadway 42.8" (1087 mm) Horizontal distance from center of rear wheel tread 0.2" (5 mm) to the left Hydraulic control system direct engine drive Transmission selective gear fixed ratio with partial (2) range operator controlled powershift Advertised speeds mph (km/h) first 1.9 (3.0) second 2.4 (3.9) third 2.9 (4.6) fourth 3.6 (5.8) fifth 3.7 (5.9) sixth 4.7 (7.5) seventh 4.8 (7.8) eighth 5.6 (9.0) ninth 6.2 (10.0) tenth 7.2 (11.6) eleventh 8.7 (13.9) twelfth 10.9 (17.6) thirteenth 11.1 (17.9) fourteenth 14.0 (22.6) fifteenth 14.6 (23.4) sixteenth 18.7 (30.1) reverse 2.0 (3.2), 2.6 (4.2), 6.1 (9.7), 7.8 (12.5) Clutch single dry disc operated by foot pedal Brakes single wet disc hydraulically operated by two foot pedals which can be locked together Steering hydrostatic Turning radius (on concrete surface with brake applied) right 159.6" (4.05 m) left 159.6" (4.05 m) (on concrete surface without brake) right 174" (4.42 m) left 174" (4.42 m) Turning space diameter (on concrete surface with brake applied) right 324" (8.23 m) left 324" (8.23 m) (on concrete surface without brake) right 360" (9.14 m) left 360" (9.14 m) Power take-off 540 rpm at 1873 engine rpm and 1000 rpm at 1918 engine rpm.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

DRAWBAR PERFORMANCE WITH RADIAL PLY TIRES

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption			Temp. °F (°C)			
					gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Cool- ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 8th (5L) Gear											
107.52 (80.17)	7772 (34.57)	5.19 (8.35)	2199	3.75	7.719 (29.218)	0.502 (0.306)	13.93 (2.744)	200 (93.3)	60 (15.3)	68 (20.0)	28.82 (97.30)
MAXIMUM POWER IN SELECTED GEARS											
93.32 (69.59)	14236 (63.32)	2.46 (3.96)	2288	14.64			3rd (2L) Gear	200 (93.1)	54 (12.2)	59 (15.0)	28.75 (97.08)
104.94 (78.25)	12094 (53.79)	3.25 (5.24)	2201	6.76			4th (3L) Gear	198 (92.2)	54 (12.2)	60 (15.6)	28.77 (97.15)
104.57 (77.98)	11770 (52.36)	3.33 (5.36)	2197	6.31			5th (2H) Gear	200 (93.1)	54 (12.2)	60 (15.6)	28.78 (97.19)
106.27 (79.24)	9316 (41.44)	4.28 (6.88)	2199	4.62			6th (3H) Gear	201 (93.6)	55 (12.8)	61 (16.1)	28.79 (97.22)
108.20 (80.68)	9114 (40.54)	4.45 (7.16)	2201	4.47			7th (4L) Gear	201 (93.6)	55 (12.8)	61 (16.1)	28.80 (97.25)
110.02 (82.04)	7949 (35.36)	5.19 (8.35)	2199	3.75			8th (5L) Gear	200 (93.1)	58 (14.4)	65 (18.3)	28.81 (97.29)
107.11 (79.87)	6941 (30.87)	5.79 (9.31)	2200	3.27			9th (4H) Gear	200 (93.1)	56 (13.3)	62 (16.7)	28.80 (97.25)
108.63 (81.00)	6049 (26.91)	6.73 (10.84)	2199	2.87			10th (5H) Gear	199 (92.8)	57 (13.9)	64 (17.8)	28.80 (97.25)
108.44 (80.86)	5002 (22.25)	8.13 (13.08)	2199	2.38			11th (6L) Gear	200 (93.1)	58 (14.4)	65 (18.3)	28.80 (97.25)

TIRES, BALLAST AND WEIGHT

Rear Tires	—No., size, ply & psi (kPa)
Ballast	—Liquid (each inner)
	—Cast Iron (each inner)
Front Tires	—No., size, ply & psi (kPa)
Ballast	—Liquid (each)
	—Cast Iron (each)
Height of Drawbar	
Static Weight with Operator—Rear	
	—Front
	—Total

Bias Ply Tires	
With Ballast	Without Ballast
Four 18.4-38; 8; 18 (125)	Four 18.4-38; 8; 18 (125)
572 lb (260 kg)	None
710 lb (322 kg)	None
Two 11.00-16; 6; 32 (220)	Two 11.00-16; 6; 32 (220)
None	None
95 lb (43 kg)	None
22 in (560 mm)	22 in (560 mm)
12325 lb (5591 kg)	9760 lb (4427 kg)
3685 lb (1671 kg)	3495 lb (1585 kg)
16010 lb (7262 kg)	13255 lb (6012 kg)

Radial Ply Tires	
With Ballast	Without Ballast
Four 18.4R38; 8; 18 (125)	Four 18.4R38; 8; 18 (125)
468 lb (212 kg)	None
730 lb (331 kg)	None
Two 11.00-16; 6; 32 (220)	Two 11.00-16; 6; 32 (220)
None	None
82 lb (37 kg)	None
22 in (560 mm)	22 in (560 mm)
12315 lb (5586 kg)	9920 lb (4500 kg)
3660 lb (1660 kg)	3495 lb (1585 kg)
15975 lb (7246 kg)	13415 lb (6085 kg)



Ford TW-15 Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska—Lincoln
Irvin T. Omtvedt, Dean and Director

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 191°F (88.1°C). Nine gears were chosen between 15% slip and 10 mph (16.1 km/h).

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1515, June 21, 1984.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers